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ABSTRACT

Word processing programs offer five capabilities that can help students over the physical and psychological constraints associated with writing. First, producing text on a word processor is more tentative and more noncommital than producing text on paper. This reassures the writer that it is all right to experiment with words. Second, the blinking cursor on the screen gently coaxes the writer to keep going. Third, text can be produced easily and rapidly. Fourth, retrospective structuring is facilitated because the text is easier to read; and fifth, the "windowing" on some programs helps narrow the gap between brainstorming and the finished product. As a result, students can begin to develop more quickly such cognitive skills as inquiring, analyzing, and arranging, which are necessary for successful writing. Furnished with the knowledge that the composing process is complex, recursive, and holistic, one can hypothesize that the intuitive process of the brain's right hemisphere may contribute to both the productivity and the creativity of this recursiveness. Therefore, any heuristic program that is developed or used in the writing classroom must not simply ask students to outline or to list, for that would counteract the recursiveness of the writing process and make the intuitive power of the brain's right hemisphere even less available to student writers. (HOD)

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TOWARDS A MARRIAGE OF TWO MINDS: THE WORD PROCESSOR AND NATURAL HABITS OF THOUGHT IN THE "DISCOVERY" STAGE OF COMPOSING

by MARY ANN ASCHAUER and FRED D. WHITE

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One of the dilemmas writing teachers have faced when attempting to teach invention to their students is that one writer's successful technique is another writer's busywork. Kenneth Pike's tagmemic grid may satisfy the craving for order that some writers feel at the outset, while other writers feel their creative energies being sapped by a kind of thought-structuring which seems more mathematical than literary. Elbow's freewriting strikes one student as a splendid way of overcoming writer's block, but another student sees it as a complete waste of energy choosing instead to stumble through, however clumsily, a first draft with her topic at least vaguely in mind.

When teaching inexperienced writers, therefore, it is difficult to determine (indeed, difficult for the writers themselves to determine) one's natural habit of thought during the composing process. Often students have been coerced into a too-formulaic, rule-bound manner of composing; others have been allowed to use only freewriting--thereby losing out on sufficient development of analytical skills. At one extreme students produce writing that seems more like committee prose than an individual voice; at the other extreme, students never are able to acquire a voice at all. No wonder so many students have come either to fear writing or seriously suspect its usefulness.

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Recently, many writing instructors have concluded that writing on a word processor can help students achieve a "writing readiness" and the feeling that they can truly be themselves. The enthusiasm of those who are using computers to teach basic writing skills as well as the writing process is unmistakable. School children in communities across the United States are introduced to the computer in the kindergarten classroom. Working with innovative drill and practice programs, these five and six year olds master simple letter identification, strengthen their word recognition skills, and improve their reading readiness. By the third grade, eight year olds are working with creative drill and practice programs to strengthen their spelling skills. Given their familiarity with computer fundamentals such as menus, cursors, return keys, space bars, simple programs, and graphics, it is no surprise that by the time they reach sixth grade, eleven year olds are working with early learning programs that seek to develop a positive attitude toward writing in the discovery stage of composing. Some programs, for example, provide children a list of words with which they are encouraged to write sentences, paragraphs, and simple stories that are then acted out on the screen using full color graphics and sound. Nor is it a surprise that by middle school twelve year olds use word processors to edit essays and that by high school fourteen year olds use word processors to revise term papers.

The enthusiasm of those who are using computers to teach writing, of course, is not limited to the K through twelve classroom. Colette Daiute of the Harvard University Graduate School of Education has de-

termined that the word processor can help student writers overcome the physical and psychological constraints natural to the writing process.[1] Because they can easily modify both the text and the format, can easily change the wording of thoughts, can easily check and correct spelling, students tend to overcome the physical difficulties of writing. In addition, students who use the word processor are relieved of some of the burden of short-term memory and thus are free to become more aware of their audience as well as their own cognitive processes. As a result of their experiences with computers and writing, students emerge with a clearer appreciation of writing as a process and thus develop a more realistic and coherent approach to writing. Moreover, fully aware of the recursive nature of the composing process, Dauite and her colleagues have focussed on the revising stage of composing, developing a program called CATCH which presents writers with prompts to stimulate revision. As writers compose with this text editing program, they can give a command to see a list of prompts CATCH provides to guide writers as they revise. At any time, writers can select, for example, the "empty word" option which allows them to identify unnecessary verbiage and to delete it immediately.[2] Dauite's preliminary experimental results suggest that the word processing program and CATCH generally stimulate writers to revise. Indeed, most student writers did more revising with pen after they had used CATCH for about a month.[3]

In addition, Valarie Arms of Drexel University has developed a program called CREATE to guide students through the prewriting stages of composing.[4] Designed to simulate an instructor's comments in con-

ference, CREATE asks twenty questions of the writer that encourage her to limit her topic, to develop her details, and to consider her audience's needs. Arms' program is open-ended in that it emphasizes exploration rather than outlining, and encourages students to respond to simply worded questions. In addition, it allows them to disregard questions they determine to be unnecessary, allows them to end the program easily when they have generated enough material to begin the writing process successfully, and provides space for free writing. Clearly, such an interactive program encourages students to generate the kind of thought process we expect for productive prewriting.

The enthusiasm of those who are using computers--both hardware and software--is, indeed, justified. Both the word processor and computer programs have the potential to assist students at the discovery stage of composing--a stage that beginning writers associate with malaise and misdirected apprehension about handwriting, mechanical errors, precise word choice, and logical or linear organization. Clearly, a new paradigm for the teaching of writing is emerging. In order for it to be useful, in order to guarantee that it is pedagogically sound, we must first examine the kinds of cognitive activities that seem best to represent the mind in the act of composing. We must then ask how both the hardware and software can be developed and applied to encourage these cognitive activities, nurture the writing process, and perhaps increase cognitive maturity. We must ask how technology and theory--how the computer and natural habits of thought in the discovery stage of composing--may be wed.

The answers to these questions evolve from composition theory. The beginning writer must be encouraged to develop cognitive skills and combinatorial activity that will stimulate the kind of thinking necessary for productive prewriting. First, the student must develop the ability to inquire, to pose questions that will lead to a workable topic. Secondly, the student must develop the ability to analyze, to break a topic into its component parts in order to identify relationships between ideas and to evaluate data. Next, the student must develop the ability to arrange, to establish a unified sequence of ideas in support of the controlling topic. Finally, the student must develop the ability to exemplify, to render the abstract topic concrete, the general topic specific. While both the word processor and text editing programs have the potential to encourage the development of these cognitive skills, until very recently this potential was not fully realized.

Colette Daiute has observed that even those students who are most eager to use the computer to compose and revise find the mechanics of word processing exasperating.[5] Indeed, the act of composing on the word processor is complicated by commands which the computer understands, and the student must master no matter how arbitrary they may seem. Students must remember the equivalents for Controls O, S, and X, for example, and always keep in mind that if by accident they hit Control N the entire piece they have been working on will be erased. If they wish to move the cursor around on the screen in order to modify a part of their essay, they must hit the Escape key twice and then hit keys I, J, K, or M depending on whether they

wish to move up, to the left or right, or down in their text. If they wish to move the cursor faster, the process becomes a bit more complicated. They must hold down the REPT key and the desired cursor move key simultaneously. Although once they master the mechanics of word processing students are able to write more efficiently, their initial experience leads them to believe that writing with pen and paper is easier and more efficient. In fact, so frustrated are some students with the computer that they feel limited when they try to write with it; as a result, there is little effect on their writing. Clearly, the conventional technology of this paradigm assists the natural habits of thought of some students while it interferes with the natural habits of others.

In the last several months, fortunately, companies like Hewlett-Packard, IBM, and Apple have released computers that are, in the best sense of the word, interactive; these machines talk to the user as often as the user talks to them. Designed on the simple premise that a computer is more useful if it is easier to use, systems like Apple's Macintosh and MacWrite can free students from much of their initial frustration. Perhaps the best example of this new technology is Apple's Macintosh and its accompanying MacWrite text editing program. Apple engineers have designed the screen layout to resemble a desktop, displaying pictures of objects that are easily recognized, such as file folders, clipboards, and trash cans. In order to pick up, hold, and move these objects around, the designers put a pointer--or cursor--on the screen and attached it to a moving box called a "mouse" which is small enough to easily fit in the hand.

As the writer moves the mouse around on her desktop, she moves the pointer around on the screen; she need not memorize any complicated commands. If she wishes to save what she has written, all she need do is move the mouse until she is pointing at the save option, click the button on top of the mouse, and the document is saved. A similar procedure applies if she wishes to print the document out. On the other hand, if the writer wishes to discard what she has written, she does so simply by pointing to what she wishes to discard, moving the pointer to the trash can icon, and clicking the button on top of the mouse.

PCs as highly interactive as the MacIntosh are likely, with sustained use, to enhance cognitive capabilities. Indeed, there are five capabilities that can help students overcome the physical and psychological constraints associated with writing.

First, producing text on a WP seems more tentative, more non-commital than producing text on paper. This reassures the writer that it is all right to experiment with words on a CRT; they seem only to half-exist in a kind of electronic limbo--almost as if they were still inside the writer's mind! The students, as Stephen Marcus explains, "no longer feel their words carved in stone."[6] As a result, students will move ahead steadily without feeling intimidated by their inconclusive gropings; they are truly able to experience writing as an act of discovery.

Secondly, the blinking cursor gently coaxes the writer to keep going. Although first time users may be annoyed by the cursor (roughly akin to using a metronome when practicing the piano),

some will quickly grow accustomed to it. Others, though, will want to move the cursor into a corner of the screen where it will not interfere with their thinking.

Thirdly, it is physically easier to produce text rapidly. One is tapping keys not pressing them. There is no paper-feed, no carriage-return, no reaching for the white-out (in most cases back-spacing and retyping is all that is necessary). It is easier to be comfortable while writing, since the detachable keyboard can be moved easily (some keyboards are cordless): you can place it on your lap if you wish, or recline on a chaise-lounge with it. The MacIntosh, in particular, has these additional features: it has adjustable touch, correcting mistakes is a cinch, and cutting/pasting can be accomplished more quickly (thanks to the mouse) than on most existing PCs. In addition, "Faster typing means faster flow of ideas," asserts Collete Daiute. "It keeps memory free for composing activities like developing content for a piece."[7] And according to Peter Elbow, faster typing "releases a natural linguistic style to replace the stilted one."[8] According to one student who had only recently begun composing on a WP, "I'm much more myself on a WP; I tend to be more formal on paper."

Next, if it is true, as Sondra Perl has observed, that "all writers . . . skilled and unskilled alike . . . use the process of retrospective structuring while writing,"[9] then the WP can aid significantly in this retrospective structuring because:

--of the extreme ease of re-reading (bright, flawlessly shaped letters, text at eye-level), writing and reading become more of an

integrated experience.

--a greater amount of text can be scanned at once on the CRT than on a sheet of paper. The "felt sense" and the recovery of discrete bits of semantic information (elements Professor Perl identifies as part of retrospective structuring) are more readily experienced.

--scrolling allows for even more rapid and efficient perusal of the entire document.

Finally, the "windowing" capability on some WP programs can help narrow the gap between brainstorming and the finished product, thus stimulating that all-important "combinatorial activity" which propels a writer from cognition to composing.[10]

Because of these capabilities, WPs can help--in fact even more successfully and consistently--student writers overcome the physical and psychological constraints associated with writing. As a result, students can more quickly begin to develop those cognitive skills--the abilities to inquire, to analyze, and to arrange--necessary for successful writing. In short, we have the technology capable of encouraging natural habits of thought in the writing process of our students. We must now give them every opportunity to use it. This may mean lobbying for the hardware and software that have this capability. It may mean rethinking curriculum. At the very least, it means that we keep in mind those capabilities available to us and our students.

While interactive hardware and text editing programs are being developed for us by Hewlett-Packard, IBM, and Apple engineers, we

will assume most of the responsibility of developing software packages with applications specific to our needs and those of our students. In fact, writing instructors and researchers have already begun to design software programs that are both innovative and pedagogically sound. For example, Stephen Marcus has designed COMPUPOEM, an open-ended courseware program that engages the student at each stage of the composing process, thus encouraging her to see writing as both a way of recording ideas and a way to generate them.[11] WANDAH, developed by Ruth Von Blum, includes a set of pre-writing and planning exercises--freewriting, invisible writing, and nutshelling--as well as revision aids that make full use of the benefits of composing on a word processor.[12] Helen Schwartz has developed SEEN, a tutorial program that prompts the student to state her opinion about a literary character, to look carefully at the primary source for evidence to support her position, and to consider anonymously logged peer responses to her hypothesis.[13] Finally, Raymond Rodrigues and Dawn Rodrigues have created a "visual synectics" program (using images to generate discourse) which enables students to consider their topics in new contexts.[14] Such advances are significant. However, despite these advances, much work remains to be done. In order to break new ground, we must apply what has been learned about the cognitive processes associated with composing in general to the particular experience of composing on a word processor.

As early as 1970 Janet Emig observed twelfth graders composing in a series of stages: writing, evaluating, reformulating, and

refining.[15] Ten years later, Linda Flower and John Hayes related the stages identified by Emig to significant writing activities. Perhaps more importantly, they suggested that these various stages interact; they are not independent nor are they sequential.[16] The writing process is not linear nor is it orderly; instead, it is recursive. In other words, writers move forward in the act of composing by looking back at what they have already written. And as we have noted earlier, Sondra Perl suggested that the parts of a piece that recur differ depending on topic and writer. Some writers reread discrete bits of semantic discourse, others return to key words that relate to their topic, and others move backward through the text to call up a "felt sense," an intuitive perception that surrounds words and invokes momentum in the writer.[17] Finally, in 1982, Monica Weis, synthesizing research that had begun a decade before at UCLA with Joseph Bogen, related the human brain's hemisphericity to the composing process.[18] Current research indicated that the left hemisphere of the brain operates logically, analytically, and sequentially, while the right hemisphere operates intuitively and holistically. Furthermore, after a child is two or three, the left hemisphere becomes dominant and whatever has been acquired by the right is lost or suppressed. Incoming language information is directed to the critical left hemisphere which perceives it and organizes it in a structured and linear form. The intuitive insights of the right hemisphere, therefore, are virtually inaccessible, having been edited and censored by the dominant left hemisphere. If we apply this theory to the composing process as

Weis did, we more clearly understand why student writers have so few flashes of intuitive insight and why we must encourage them so consistently.

Taken as a whole, these observations tell us a great deal about the process of composing that may be used to determine how new technology may serve us and our students best. In other words, these observations help us to better answer the question "How can the word processor promote greater interplay between the hemispheres, between analytic/formative and intuitive/generative modes of thought?"

We know that the composing process is complex. We know that it is recursive. The student writer reads, she writes, invents, and revises, not linearally but holistically. We can hypothesize that the intuitive process of the brain's right hemisphere may contribute to both the productivity and creativity of this recursiveness. We also know that the dominant left hemisphere, in a sense, works against this contribution. At the very least, then, any heuristic programs that we develop or choose to use in our writing classes must not simply ask students to outline or list for such programs would counteract the recursiveness of the writing process and make the intuitive power of the brain's right hemisphere even less available to student writers.

Following the example of Hugh Burns,[19] teachers and researchers have begun to develop and use open-ended heuristic programs. However, the potential contribution of the right hemisphere to the writing process has yet to be fully tapped. One of the few programs

to tap this resource is an Apple spelling improvement program which uses visual reinforcement instead of drill and practice word memorization.[20] In effect, the program uses the left side of the brain in combination with the right to increase a student's spelling ability by encouraging her to see words in her mind's eye. This is accomplished by using flashing letters and changing colors in order to display words and emphasize their structural images, thus impressing them on the cognitive senses.

Dancing letters and shifting chromatic values may not be appropriate in a program designed to encourage the kind of thought necessary for good writing. However, as we seek to develop new heuristic programs for our students--or as we decide which programs to use in our classes--it is appropriate to consider the work of a researcher like Gabriele Rico.[21] Seeking to tap the creative power of the brain's right hemisphere, Rico encouraged her composition students to use the nonlinear brainstorming process of clustering. As a result, in addition to a reduction of mechanical errors, the writing of a significant number of her students "demonstrated a coherence, unity, and sense of wholeness; a recurrence of words and phrases, ideas or images that reflected pattern sensitivity; an awareness of the nuances of language rhythms, a significant and natural use of images and metaphors; and a powerful 'creative tension'".[22]

To be sure, there are problems, including over-dependency on heuristic guidance, lack of opportunity to struggle with aspects of a topic over a sufficient length of time, condescending computer

responses, and a vague sense of loss when away from the "earthy feel" of pen and paper for too long. Nevertheless, it is altogether appropriate to wed reason and imagination, the left and right hemispheres of the human brain. Indeed, by doing so, we move closer to a marriage of two minds: the word processor and natural habits of thought in the "discovery" stage of composing.

Mary Ann Aschauer

Fred D. White

NOTES

[1] Colette Dauite, "The Computer as Stylus and Audience," CCC, 34 (May, 1983), 134.

[2] Colette Daiute, et. al. "The Computer in the Writing Class: Problems and Potentials," Unpublished paper (undated), p. 23.

[3] Daiute, "The Computer in the Writing Class. . . ." p. 26.

[4] Valarie Arms, "Creating and Recreating," CCC, 34 (October, 1983), 357.

[5] Daiute, "The Computer in the Writing Class," p. 26.

[6] Steven Marcus, "Real Time Gadgets with Feedback: Special Effects in Computer Assisted Instruction." The Writing Instructor, 2 (Summer, 1983), p. 158.

[7] Daiute, "The Computer as Stylus and Audience," p. 141.

[8] Peter Elbow, Writing Without Teachers (New York: Oxford University Press, 1973).

[9] Sondra Perl, "Understanding Composing," The Writer's Mind: Writing as a Mode of Thinking, ed. Janice N. Hays, et. al. (Urbana: NCTE, 1983), p. 49.

[10] "Windows on the World," Time, Nov. 28, 1983, p. 90. "Windowing" refers to the juxtaposing of one or more "files" upon the file already on the monitor.

NOTES (Continued)

[11] Steven Marcus, "The Muse and the Machine," Handbook for Planning an Effective Writing Program, rev. ed. (Sacramento: California State Department of Education, 1983), pp. 59-62.

[12] Ruth Von Blum. "WANDAH--Writing Aid and Author's Helper," unpublished document, 1983.

[13] Helen J. Schwartz, "A Computer Program for Invention and Feedback," ERIC (ED 214 177), March 1982, p. 1.

[14] Raymond Rodrigues and Dawn Rodrigues, "Computer Based Invention: Its Place and Potential," CCC, 35 (Feb., 1984), 83.

[15] Janet Emig, The Composing Process of Twelfth Graders (Urbana: NCTE, 1971).

[16] Linda Flower and John Hayes, "Identifying the Organization of Writing Processes," Cognitive Processes in Writing (Hillsdale, NJ: Laurence Erlbaum Asspciates, 1981).

[17] Sondra Perl, pp. 44-45.

[18] Monica R. Weis, SSJ, "Current Brain Research and the Composing Process," The Writer's Mind. . . pp. 25-33.

[19] Hugh Burns, "A Writer's Tool: Computing as a Mode of Inventing," ERIC (ED 193 693). Oct., 1980.

NOTES (Continued)

[20] Jeffrey Stanton, et. al., "Whole Brain Spelling," The Book of Apple Software. (Los Angeles: The Book Co., 1984), p. 167.

[21] Gabriele Rico, Writing the Natural Way (Los Angeles: J. P. Tarcher, Inc., 1983).

[22] Rico, p. 11. Newer software such as MacIntosh's MacPaint program (which permits an interaction of text with graphic art), seems particularly well-suited for exercises that could strengthen left-brain/right-brain synthesis.